Multimedia manual of cardiothoracic surgery: the internet-based educational tool

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Editorial

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1. Introduction

In September 2005, the European Association for Cardio-Thoracic Surgery (EACTS) officially launched the Multimedia Manual for Cardiothoracic Surgery (MMCTS) as a novel educational tool for cardio-thoracic surgeons, both for those in training and for the established surgeons in practice. The basic idea was to replace the standard textbooks and surgical manuals with an internet-based educational tool, utilizing the vastly improved technology for presenting the instructive material in color, in moving pictures and with sound, and concentrating on surgical techniques.

Scientific exchange and information in the field of cardio-thoracic surgery is abundantly served with the present, well-established journals and with the annual meetings of the major professional organizations. But there is also a growing need for the transfer of 'how-to-do-it' knowledge: the excellent results with novel or complex surgical techniques in the hands of prominent experts might not deliver proper results in another institution. The only method to guarantee the proper application of standard and novel surgical techniques is to carefully observe the procedure when it is being performed by experts. Presently, the EACTS annual 'Technocourse' and various topic-oriented meetings, with direct transmission from the operating room, perform this function; but such methods of information exchange have several drawbacks. It can be tedious to watch the whole procedure when one is interested only in some crucial minutes of surgery; and the visualization itself can be deficient. The case being transmitted live might not be an ideal one: for the publication in the MMCTS one can select appropriate material from several previous cases. And not many people have time, leisure and finances to attend such courses, especially when working in developing or under-privileged countries. The basic idea of the MMCTS is to provide high-level information about surgical techniques, which can be studied at leisure, independent of time and place. Furthermore, the viewer can select only the particular parts of the procedure, or go through the whole operation in a systematic manner.

2. Structure of the MMCTS

The content of the MMCTS — http://mmcts.ctsnetjournals.org/ — consists of eight sections, each one addressing a separate field of cardio-thoracic surgery. Each section is in charge of a section editor, who selects the authors who are invited to submit their description of a particular procedure, for which they are considered to be experts. Therefore, the submissions are mostly by invitation, but free submissions are also accepted, when they meet the needs and the criteria of the MMCTS. All submissions are reviewed by the Editor-in-Chief and by the section editors, and by further reviewers, when necessary. Before final acceptance, each submission usually undergoes several revisions. The editors pay attention to avoid repetitive descriptions which can be found elsewhere in the MMCTS (incisions, cannulations, etc.), insist on optimal quality of schematics, photographs and, most notably, of video clips, they ask for a short literature overview of the operation being described, and check that only relevant, recent literature is being quoted.

3. Main characteristics of the MMCTS

MMCTS is intended to be a repository of present surgical techniques, and not a scientific publication in a conventional manner. It is very difficult, not to say impossible, to read large amount of text on the computer terminal. Therefore, the MMCTS presents only a minimum of text, concentrating on a graphic description of a surgical procedure, using schematics, short video clips (up to 60 s is considered maximum), photographs, possibly sound, and ample legends for the illustrations, which can be perused when watching a movie clip. The second unique characteristic of the MMCTS is the possibility to enter the full text of the reference quoted in text, based on the unique HighWire technology, http://highwire.stanford.edu, with its vast library of relevant scientific journals. The access to the full text of the reference is free for the users of the MMCTS, as is the

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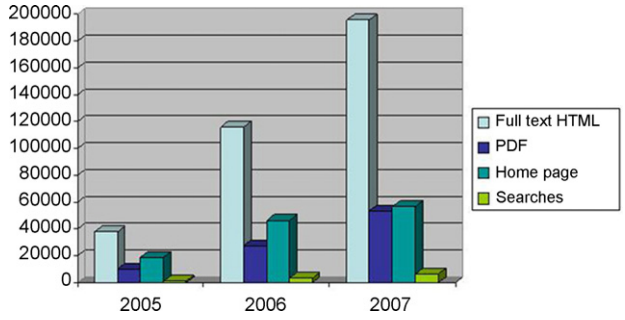

Fig. 1. MMCTS Usage statistics.

access to the MMCTS in general. Taking the possibilities of internet technology a step further, the MMCTS facilitates the description of surgical techniques by leading the reader directly to the industrial product being described, by means of an http hyperlink.

4. Present experience with the use of the MMCTS

The electronic tracking possibilities of the manuscript-processing agent, allow the assessment of the usage of the particular publication in the internet by the amount of hits it receives from the users. These are grouped as Portable Document Format (PDF), home page hits, HyperText Markup Language (HTML), and individual searches (Fig. 1). Although the exact data are difficult to determine, due to the large number of web 'crawlers', which blindly collect the information from any web page, there seems to be a healthy and rising interest in the MMCTS.

Trying to elucidate the needs and the priorities of the MMCTS users, a questionnaire was prepared by HighWire Press and put on the web site for the duration of four months. The users were asked a number of questions about the MMCTS: from where do they access the manual, how often and how long, what do they use the information for, and which features of the manual do they consider most important. A total of 84 users submitted complete answers: they come from all continents, are predominantly practicing cardiac surgeons, work in university hospitals or medical schools (Fig. 2), they access the MMCTS mostly in the evening, after working hours, from home (Fig. 3); and consider the video clips to be the most important part of the MMCTS. They use the MMCTS to improve their surgical knowledge, and more than half of the correspondents indicated that the use of the manual changed their surgical practice. Almost all (98.8%) consider the MMCTS to be useful to them in the present form.

8. Please identify your primary job function.

	Response Percent	Response Total
Practising surgeon	**49.4%**	**41**
Surgeon in training	36.1%	30
Medical student	1.2%	1
Other medical practitioner	0%	0
Industry	0%	0
Layperson	0%	0
Other (please specify)	13.3%	11
Total Respondents		**83**
(skipped this question)		1

9. Please indicate your specialty.

	Response Percent	Response Total
Predominantly cardiac	**48.8%**	**40**
Predominantly thoracic	17.1%	14
Both cardiac and thoracic	28%	23
Other specialty	6.1%	5
Total Respondents		**82**
(skipped this question)		2

10. At what type of institution do you work?

	Response Percent	Response Total
Private hospital	13.3%	11
Public hospital	26.5%	22
University medical school/hospital	**53%**	**44**
Other university department	1.2%	1
Medical practice	0%	0
Industry	0%	0
Other (please specify)	6%	5
Total Respondents		**83**

Fig. 2. Answers from the questionnaire concerning the profile of the MMCTS users.

5. When do you access MMCTS?

	Response Percent	Response Total
During working hours	28.4%	23
After working hours	**71.6%**	**58**
On the weekends/days off	27.2%	22
Total Respondents		**81**
(skipped this question)		3

6. From where do you access MMCTS?

	Response Percent	Response Total
From home	**53.7%**	**44**
From the office	36.6%	30
Other (please specify)	9.8%	8
Total Respondents		**82**
(skipped this question)		2

7. How many hours per week do you access MMCTS?

	Response Percent	Response Total
Less than 1 hr	31.7%	26
1-5 hrs	**59.8%**	**49**
> 5 hrs	8.5%	7
Total Respondents		**82**
(skipped this question)		2

Fig. 3. Details of the MMCTS use.

5. Advantages of electronic publishing

Electronic media have one tremendous advantage over conventional modalities of publication (newspapers, journals, books): it is their immediacy, the ability to provide instant information on any topic of interest. It is this

proximity to the evolving events, which the Internet shares with television that makes MMCTS so attractive, and shows the way that surgical education will develop in the near future. As an example, the MMCTS carried in July a description of Damiano's present technique of surgery for atrial fibrillation [1], based on his talk given at the postgraduate course during the Society of Thoracic Surgeons meeting in San Diego in January 2007; or the extensive description of the aortic valve repair by Prêtre and co-worker [2], which has not been presented in such detail before. In the next month, MMCTS will open a special section 'Innovations', where the authors will be able to present their work in progress, which has not been published before, and only presented in some specialized courses. Such rapidity of information exchange is of paramount importance in rapidly evolving fields, both in the area of cardiac (percutaneous, endovascular and minimally invasive procedures) and pulmonary (transbronchial and other 'natural orifice' surgery) interventions.

MMCTS procedures now receive Podcast interviews with the authors [3,4], delineating important new developments and the author's personal opinion about questions arising from his/her contribution; this feature was added in September 2007. Further innovation of the MMCTS, another substantial advantage of electronic publishing, is the periodic update of the literature, where the authors can add to their previously published procedures [5]; this literature 'Addendum' [5] has the advantage of updating the information, without having to change the entire article.

6. Further development and struggle with electronic complexity

MMCTS recently added the 100th procedure to its content; the ultimate goal is presently set at around 400—500 surgical procedures from the field of cardio-thoracic surgery. The recruiting of the high-level material has been disappointingly slow: the best cardio-thoracic surgeons are also very busy people and the submission of the MMCTS procedure is totally different and more complex than submission of an article to a scientific journal, due to the intricacies of the file download. Many users of the MMCTS still experience difficulties in downloading the videos, due to hospital servers' filters, which is probably the reason why most of them utilize the MMCTS from home. There is no simple solution to this problem, because MMCTS must stay with the RealPlayer technology, which is still the optimal program for transmitting videos, due to the rapid transfer of data (and the main reason why leading news channels use the same technology). Submitting to the MMCTS is still more complex, due to the lack of standardization of various video formats; when our video editing programs do not suffice, the editorial office relies on the knowledge of the HTML formatters in India.

Financial support from the EACTS is presently assured, and the MMCTS will be continued as a free-access educational tool, fulfilling one of the cherished goals of the association, i.e. transfer of knowledge to the less-developed nations.

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